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develop first as confervoid bodies, growing by a single apical cell. This body then becomes monostromatic, with a monosiphonous stipe. The two cells situated side by side at the same level below the apical cell initiate the monostromatic blade, and this blade becomes distromatic at base, and at the same time the monosiphonous stipe becomes polysiphonous. A new meristematic tissue appears at the transition region between blade and stipe. The growth both in length and breadth is due to the apical and stipo-frondal growth up to a certain period. The apical growth gradually diminishes and finally ceases, and then erosion of the apex of the blade follows. A single precortical layer of large parenchymatous cells is developed at the transition region between the already existing two layers. The hyphal cells are formed as the precortical layer becomes doubled, and the expansion of their distal ends into a trumpet shape takes place at the intercellular spaces. The ribs and meridional region are formed by special thickening of the cortical layers. The dorsiventrality of the lamina, if it exists, is indicated simultaneously with the formation of these parts. The cryptostomata in the Laminariaceae do not originate from a single cell.—S. YAMANOUCHI.

Geotropism.—ÁRPÁD PÁÁL¹⁴ finds that reduction of the air pressure lengthens the geotropic reaction and presentation times in the root of *Phaseolus vulgaris*. The presentation time was 6 minutes at one atmosphere; 20 minutes at 0.74; 35 minutes at 0.21; and 70 minutes at 0.08. The reaction time was found markedly variable when all controllable conditions were constant. From the average of many measurements, the author finds that if at one atmosphere the reaction time is considered as 1, at 0.74 atmosphere it is 1.09; at 0.34 atmosphere 1.39; at 0.21 atmosphere 1.60; and at 0.08 atmosphere 2.20. It is interesting to see what slight reductions in pressure cause a lengthening of these critical times. It is well known that the respiratory intensity is not cut until the pressure is reduced to a much greater degree. If the effects here are due to the reduced oxygen pressure, as is assumed, one sees what a complex rôle oxygen plays in the organism, the several functions apparently having very different critical pressures. The author concludes that the lengthening of the reaction time is due to the sum of the effect of reduced pressure upon the sensory and motor phases and to the telescoping of these phases.—WILLIAM CROCKER.

Formaldehyde and green plants.—GRAFE¹⁵ finds etiolated plants or non-chlorophyll parts of green plants very sensitive to vapors of formaldehyde, especially if the cultures are illuminated. The chlorophyll-bearing parts (*Phaseolus vulgaris*) are not injured by concentrations as great as 1.3 per cent

¹⁴ PÁÁL, ÁRPÁD, Analyse des geotropischen Reizvorgangs mittels Luftverdünnung. Jahrb. Wiss. Bot. 50:1-20. 1911.

¹⁵ GRAFE, VIKTOR, Untersuchungen über das Verhalten grüner Pflanzen zu Gasförmigen Formaldehyde. Ber. Deutsch. Bot. Gesells. 29:19-26. 1911.

of the atmosphere. Illuminated cultures of green seedlings in CO₂ free chambers gave much greater growth and increased dry weight if formaldehyde vapors were present than if they were not. It was necessary of course to protect the non-chlorophyll-bearing parts from contact with the vapors. Formaldehyde increases the reducing sugars in *Phaseolus* at the expense of starch deposit. This may account for the failure of starch to appear as a result of the synthesis of formaldehyde. These results, with the more telling experiments of SCHRYVER,¹⁶ USHER and PRIESTLY,¹⁷ and others, furnish strong evidence that formaldehyde is an intermediate product in photosynthesis.—WILLIAM CROCKER.

Phosphorus content of oat grains.—LEWONIEWSKA¹⁸ finds that the phosphoric acid content of oat grains, measured both in absolute amount and in its ratio to the nitrogen, varies greatly with cultural conditions, involving variation in fertilizers and nature of the soil. The variation is mainly due to the inorganic and phytin phosphoric acid, and not to the protein and lecithin phosphoric acid. The author thinks that an excess in the soil leads to its storage in the inorganic and phytin forms. A variation in the nitrogen content of the grain is mainly due to the protein nitrogen. The author concludes that the phosphoric acid supply in the soil can be best judged by the ratio of inorganic and phytin phosphoric acid to protein nitrogen in the grain. The probabilities are that the conditions determining the proportion of absorption and form of storage of nitrogen and phosphorus compounds are much more complex than the author assumes.—WILLIAM CROCKER.

A new genus of yeasts.—NADSON and KONOKOTINE¹⁹ have described a new genus (*Guilliermondia*) of Saccharomycetes, in the culture of which they observed the pairing and fusing of unequal cells ("gametes"), resulting in a cell that became an "ascus" producing one spore (sometimes two spores). In the germination of the spore under usual conditions, cells with the ordinary budding habit were produced. The full account is in Russian and the brief summary in French.—J. M. C.

¹⁶ SCHRYVER, S. B., Photochemical formation of formaldehyde in green plants. Proc. Roy. Soc. London B **82**:226-232. 1910; rev. in Bot. Gaz. **51**:470-471. 1911.

¹⁷ USHER, F. S., and PRIESTLY, J. H., Proc. Roy. Soc. London B **84**:101-112. 1911.

¹⁸ LEWONIEWSKA, S., Schwankungen in dem Gehalte der Pflanzensamen an einzelnen Phosphorsäureverbindungen in ihrer Abhängigkeit von Vegetationsbedingungen. Bull. Acad. Sci. Cracovie 1911:85-96.

¹⁹ NADSON, G. A., and KONOKOTINE, A. G., *Guilliermondia*, un nouveau genre de la famille des Saccharomycètes à copulation hétérogamique. Bull. Jard. Imp. Bot. St. Pétersbourg **11**:117-143. figs. 45. 1911.